```
**********************************************************************
*                                                                    *
*          QQQQQQQQ        ZZZZZZZZZZ      XX      XX              *
*         QQQQQQQQQQ       ZZZZZZZZ          XX    XX              *
*         QQ      QQ             ZZ          XX XX                 *
*         QQ      QQ            ZZ             XXX                 *
*         QQ      QQ           ZZ              XXX                 *
*         QQ    QQ QQ         ZZ               XX XX               *
*         QQQQQQQQQQ         ZZZZZZZZ          XX   XX             *
*          QQQQQQQQ         ZZZZZZZZZZ       XX     XX            *
*                QQ                                                  *
*                                                                    *
**********************************************************************
```

The Journal Covering Amateur Radio & Sinclair Computers
ZX-80; Micro-Ace; ZX81; T/S 1000, 1500, & 2068

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88001

K5XY
Alex. F. Burr
Publisher

W4GHV/5
Bo Barry
Editor

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QL (6)
Alex. F Burr K5XY

This month the focus of this column is on one of the four software packages which comes with the QL. These packages provide a comprehensive word-processing, planning, information handling, and graphics capability and are intergrated in style, structure, design, and in the sharing of information. The wordprocessor is called QUILL, the spreadsheet is called ABACUS, the database is called ARCHIVE, and the graphics program is called EASEL.

This month we will discuss EASEL, the graphics program.

EASEL is a spectacular graphics creating program that provides the most dramatic and effective way of communicating a series of numbers.

EASEL is totally interactive and leads the user straight into graph creation without ever having to construct a table of values or face a barrage of questions before seeing any results. The familiar pyramidal structure allows deeper digging to various levels of user design, even to the extent of defining the color of the graph "paper" and of the text and axes.

There are a series of eight pre-set formats which can be called with a single keystroke, giving bar graphs of different colors and styles, such as stacked bars, overlapping bars, plus line graphs and pie charts. Any of these formats can be altered to suit the user's requirements, and throughout the program choice can always be made by example, that is EASEL will illustrate the various options available.

Text can be placed anywhere on the screen using cross-wires for positioning, and it can be subsequently moved if required. In fact EASEL behaves intelligently, homing in the cross-wires on the nearest piece of text, or the caption, or the axis labels.

However, EASEL is more than just a means of plotting data, it can manipulate and evaluate expressions and has a series of mathematical functions. Thus a graph of "profits" can be calculated and displayed simply by typing "profits = sales - costs". Furthermore logarithmic and trignometric expressions can be utilized.

EASEL is designed to handle data entry, manipulation, display, and printout in a totally self-contained manner. At the same time it is capable of receiving data from ABACUS or ARCHIVE (and exporting it back) or sending graphs to QUILL for inclusion in a document.

Key features include:

Fully interactive entry is always directly in graphics mode with each action producing the immediate visual result.

Data and format are logically separate so that the same set of data can be observed in innumerable different styles.

Includes bars, lines, filled lines, pie charts, mixed lines and bars, stacked bars, side-by-side bars, and overlapping bars.

Highlighting of special bars or pie slices.

Text - entry at arbitrary positions with titles, axes, and keys.

Pick up and move text, keys, and titles.

Horizontal and vertical representations.

Standard formates and user defined formats are available down to the smallest detail.

Use of formulae with common math functions for the creation, analysis , and manipulation of data sets.

Help pages facility available through software at any stage with call-up of relevant pages.

Automatic vertical and horizontal scaling.

Editing with cross-wires.

Export of graphics pictures to QUILL word processor and data to or from ARCHIVE and ABACUS.

Unfortunately nothing has yet been said about printer support.

THE USR COMMAND
K5XY

Almost everybody knows that our Timex Sinclair computers come with two languages - BASIC and Machine. Most people use BASIC almost exclusively. It is much more like English and is much easier to use. Machine language consists only of a series of 0's and 1's. However, it is much faster than BASIC, particularly on our computers.

The best way to write programs is to use BASIC when you can and to reserve Machine language for parts of the program which are often used or must for some other reason run as fast as possible.

It is the USR command which permits both languages to be used in the same program. In principle this command is simple. The form of the command is USR n, where n is the address (in decimal for our computers). For example, you might see in a BASIC program USR 980. The computer would go to memory location 980 and execute whatever instruction you had put there. It would then go on to the instruction in location 981 and continue in that manner until it encountered an instruction to return to the basic program; whereupon it would take up where it left off in the BASIC part of the

program.

The odd REM statements you often see at the start of programs in QZX are put there so that the proper machine code instructions will be in the proper memory locations when the computer needs them.

But I have never seen the USR command in a line by itself, and in different programs it is associated with different action instructions. This has always puzzled me, but recently things have been getting a bit clearer.

It turns out that USR is really a function, not a command. Hence, it must be associated with some action instruction: which one depends on what you want the machine language to do when it returns to the BASIC program.

Two of the instructions most often associated with USR are LET and PRINT. Consider the following lines.

```
10 LET M = USR 980
20 PRINT USR 980
```

In the first line when the Machine program returns to the BASIC program, it places the number that it calculated into the BASIC variable called M. In the second line the Machine program printed on the screen the number which it calculated. Sometimes you are not concerned with anything that the Machine program calculated because you had it perform some action. In that case many people use a line something like

```
30 RANDOMIZE USR 980
```

Here people use RANDOMIZE, not because they want to have anything to do with random numbers; but because the Machine code has already done what you want it to do, and the RANDOMIZE instruction does nothing more to your program.

Of course, in both of these last two cases you could have preceded differently. To print to the screen, you could have used line 10 and then

```
20 PRINT M
```

In the last case, where you did not want the Machine program to do anything after it was finished, you could have used line 10 and then just ignored the variable M for the rest of the program. Line 30 does save a little memory however.

Of course, you can use USR n anyplace a BASIC variable can be used. As for example in the following IF statement.

```
40 IF USR 16514 < 50 THEN STOP
```

In summary, remember that USR is a function which must be used with another command. Many people use it with LET if they will use the number returned by the Machine program elsewhere in the BASIC program, with PRINT if they want the result to appear on the screen, and with RANDOMIZE if the desired Machine code action has already taken place.

FLASH!!

Have just received a xerox copy of the British QL instruction book. US Sinclair hopes to send order blanks in December. If you want one, write to Sinclair Research Limited USA, 50 Staniford St., Boston, MA 02114.

TROUBLE SHOOTING
K5XY

The ZX81 and the T/S 1000 are basically the same computer and the same things usually go wrong with them. The most common problems are (in rough order of probablity)

1. Difficulty in loading programs from tape.
2. RAM pack wobble.
3. Keyboard malfunction.
4. Ground strap separation.
5. Regulator failure.

The problem of difficult program loading from a tape is usually the fault of ac hum in the output of the tape recorder or misalignment of the recorder head. Cures for these problems have been mentioned in this and previous issues of QZX.

Ram pack wobble is to be suspected if the program suddenly stops working and the screen goes blank. Sometimes the screen begins scrolling wildly with unknown characters flashing up the screen before it goes blank. The cause of these difficulties is a bad connection to the external 16 K RAM. The cure is to carefully clean the edge connector on the computer and fasten the RAM securely to the computer. Cotton swabs dipped in denatured alcohol make good cleaners. One popular way to secure the RAM is to use a strip of velcro or double sided tape between the RAM and the computer.

If suddenly one or more of the keys become inoperative or intermittent, the most likely cause is a broken ribbon cable. The keys most commonly affected are keys 1 - 5. The laminate that the cable is made of becomes dry and brittle and eventually cracks.

In this case the computer has to be opened and the ribbon cable connecting the keyboard to the main circuit board carefully pulled from its socket. To open the case you must remove five small screws from the bottom of the computer. Three of these screws are under the rubber feet of the computer. (The one closest to a screw hole does not have a screw under it.) Some of the screws are shorter than the others. Be sure you get them back in the same holes they came out of so that nothing is shorted out inside upon reassembly.

Inspection of the ribbon cable will usually locate the break. If you are lucky, and most people are, the break will be near the socket end. In this case cut the break off and insert the cable back into its socket. Do this carefully so as not to bend the cable. Reassemble the computer and get it back to work.

If the break is too far from an end, an application of conducting paint liberally applied will often work.

If suddenly you get greatly increased interference on the TV monitor screen, it may be that the grounding strap on the foil side of the main circuit board has broken loose from the foil near the edge connector. The cure is to open the computer as above and solder the grounding strap back. Be careful, of course, not to get any solder bridges on the board.

If the 5 volt regulator overheats it will sometimes cause the computer to crash after 15 or 30 minutes of work. This regulator is mounted to a square flat piece of aluminum inside the case. Sometimes the screw and nut which holds it just needs to be tightened.

The main things left to go wrong are the integrated circuit chips. With the computer opened up you can see four IC's (five in some ZX81's). The ones which most offen go wrong are the ULA and the RAM. If the ULA is bad, it usually gets very hot and control of the computer is lost. If the RAM is bad, generally the cursor won't come up but the screen steadies. If you think that the RAM is bad and you have a 16 K RAM pack, just remove the RAM from the computer and try it with the 16 K RAM pack. When the pack is used the internal RAM is not.

There are three different issues of the T/S 1000 and several of the ZX81 so the layout will not be the same for each. The ULA is one of two biggest chips on the board. It will be labled ULA or have Ferranti printed on it. The other big chip is the Z80 microprocessor. The ROM is socketed and unfortunately the RAM is soldered onto the board.

Remember that you are dealing with sensitive components and make sure the computer is off before disconnecting anything.

T/S 2068 PORT ASSIGNMENTS
K5XY

Those who are interested in getting the most out of new programs will need to know the port assignments which can be used with the T/S 2068. These are alluded to in the instruction manual but not given. Many of them are included in the Technical manual for the T/S 2068 but even there one does not find them all. The following information comes indirectly from Timex. In the table the vertical borders show the most significant hex digit of the port address and the horizontal borders show the least significant hex digit. Table entries indicate devices from the numbered list that follows the table. Blanks in the table indicate ports available for use as of November 2, 1983.

TABLE 1. T/S Port Assignments

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0																	0
1																	1
2																	2
3																	3
4																	4
5																	5
6																	6
7				9						9							7
8	6	6	6	6						A	6	6	6	6			8
9	6	6	6	6							6	6	6	6			9
A	6	6	6	6							6	6	6	6			A
B	6	6	6	6							6	6	6	6			B
C	6	6	6	6							6	6	6	6			C
D	6	6	6	6							6	6	6	6			D
E	6	6	6	6							6	6	6	6		8	E
F	6	6	6	6	2	4	5	8	6	6	6	6	7	7	1	3	F
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	

TABLE 2. Entry Identification

ID	Read/Write	Device
1.	Read	Keyboard/Cassette
1.	Write	Boarder/Beep/Cassette
2.	Rd/Wr	Dock Horizontal Select
3.	Rd/Wr	Enhancement Port
4.	Write	Sound Chip Address
5.	Rd/Wr	Sound Chip Data
6.		T/S 2040 Printer
7.		Bank Switching
8.		Micro-Drive
9.		Modem
A.	Rd/Wr	Centronics Interface

ADVANCED 2068 GUIDE
K5XY

Timex Sinclair 2068 Intermediate/Advanced Guide is the second, more advanced, of two T/S books published by Sams. This book will take you beyond BASIC into the world of computer circuits, the Z80 microprocessor, the BASIC interpreter, computer generated sound, and machine language. The main goal is to show you how to make your programs do things not otherwise possible with BASIC. At the same time you will learn a lot more about how your computer works. The book assumes only a

working knowledge of the T/S 2068 and BASIC programming such as can be obtained from the manual which comes with your computer.

The book serves two purposes. It describes how a computer works, and it introduces the reader to machine language programming. The first part of the book covers computer basics: the operation of computers in general and the T/S 2068 in particular. It includes a description of most of the T/S 2068 hardware. The second part introduces machine language and ends with a section that describes now machine language routines can be used within BASIC programs on the T/S 2068.

The book also serves as a reference guide to the T/S 2068. It contains complete information on the various expansion connectors for hams trying to interface equipment to the computer.

There are two main sections of the book which by themselves make it worth purchasing. The first is the section on machine language and the second is the chapter on sound production.

The machine language section starts out with 5 chapters which almost completely ignore the T/S 2068. However, it does describe in readable form machine language programming for the Z80, which is the heart of the T/S 2068. The Z80 instructions are grouped into logically related sections and described in easily understood terms. Instructions are even given on how to write down in standard form machine code so that it can be easily hand assembled into numbers the computer can understand, input to an assembler program for automatic translation, or read and understood by another programmer. The last chapter in this section does apply all that is learned in the proceeding chapters to the T/S 2068. It gives specific examples of machine language programs, details of how to take advantage of machine language programs in the T/S 2068 ROM and even a sample program for easily entering short hand assembled code.

In short, if you want to learn machine language, you would be hard pressed to find a better introduction.

The chapter on sound production is much more than just instructions on how to change your computer into a programable keyboard instrument. It is a well written, clear, elementary introduction into the creation of musical sounds. Everything is illustrated with very specific short programs on the T/S 2068. The chapter is short; but, when you finish, you will be able to create notes of any type you wish and you will have seen examples of programs creating such effects as tremulo, vibrato, and cords, to say nothing of really fancy code practice sounds.

Of course, nothing is ever perfect, Table 2-5 turned up missing (really misnamed). In the sound chapter, advice on the use of one of the control bits in the figures disagreed with the advice given in the text. The first chapter is just too simple minded for a book of this level. But the book is well written and informative. If you want to go beyond the level set by the manual which came with your T/S 2068, I know of no better book to start the journey with. Sams is to be congratulated for publishing this book at this present time (and Mazur for a good writing job).

TIMEX SINCLAIR 2068
INTERMEDIATE/ADVANCED GUIDE,by Jeffrey Mazur
Howard W. Sams and Co. Inc., 4300 West 62 St.
Indianapolis, IN, 46268,$9.95
ISBN: 0-672-22226-4 232 pages including index

PUBLISHER'S NOTES

Bo and I try to keep the contents of QZX as relevant to hams as submissions permit. Therefore I have been wondering just how useful the QL description articles have been. The Sinclair people have supplied lots of information but little hardware. The introduction in Great Britain was not smooth and it does not look like it will be introduced in this country this year as they had planned. I have heard good reports about the software. If you want these descriptive articles to continue drop us a card or leave a note on Bo's bulletin board.

We are thinking of reprinting in a more permanent form some of the more popular and useful articles from past QZX's. If you consider articles in QZX as candidates for reprinting, mention them too.

Reprints of most of this year's issues are still available (for $1.00 each), but some months have been sold out (May and July) and we only have one copy of the Nov '83 RTTY special ($2) left.

November is another critical month for QZX. Over 20% of our subscriptions expire in this month. If yours does (look on your mailing label for your expiration date) please renew at once before you forget.

A note about Bo's Bulletin Board: - due to continued abuse by a local idiot, the bulletin board will be made private. All QZX readers are WELCOME to use it, using the following logon sequence: last name= **JOURNAL**, first name= **QZX**, password= **W4GHV**. Please leave BO a message (SYSOP), with your name & call. It will be expanded shortly to include an 80 track double-sided double-density drive and will contain more download programs. No T/S specific programs are on it so far, however.

"TYPE 2068"

by

Kraig D. Pritts
KA2LHO

This program is a modification of the TYPE program written by Mr. R. J. Lees-W3ZQN and published in the May 1983 issue of QZX. TYPE was an excellent program which made good use of the capabilities of the TS 1000 and TS 2040 printer. I used TYPE a great deal in the preparation of articles (for QZX), short notes, etc. When I got my new TS 2068 however I found that the original program would not work due to the SCROLL command which is not found on the newer machine. Various published substitutes for this command also did not seem to do the job. As a result I set out to modify the program to work with my 2068. Not only was the program made to work but a few additional features were added for easier (I think) edit and movement around the screen.

The first thing that you will notice upon running the program is that a border is present. I find it much easier to type when I can see where I am in relation to the edges of the work area. The border is set in line 2 and can be modified or eliminated as suits your individual tastes. You have the entire upper and lower case alphabet available to you as well as all numeric characters. In addition, you have access to all characters and symbols that are usually available via the SYMBOL SHIFT key. If you should happen to BREAK the program simply enter CONTINUE and the program will continue from where the break occurred with no loss of text.

I have not changed the edit procedure set up by Mr. Lees in the original program but I have included the suggested edit mods published in the Sept 83 issue of QZX. To edit at any time during text entry press SHIFT and the '1' key. At the bottom left corner of your display you will have an 'L' cursor. You first enter the line you wish to edit (top line i 0) and then the column across which you wish to edit (left column is 0). You may begin your editing to the end of that line after which you will again have a full display with no cursor shown. In addition to these regular editing features I have included the use of the 5, 6, and 7 arrow keys. The 5 key remains as in the original, placing the cursor at the beginning of the next line. The shift 6 key will print a space at the current cursor position and move the cursor exactly one line down in the same column. The shift 7 key works in a similar fashion except that the cursor is moved up one line. The shift 8 key is not used because the space bar serves the exact same function of printing a space and moving the cursor one position to the right.

When you have filled a screen and completed the editing procedures, you will want to send the text to your TS 2040 or ZX printer. To do this simply press the colon key (:) while holding down the SYMBOL SHIFT key. The copy command will be executed and you text will roll right out of the printer.

With the TS 1000 it was possible to outtype the program, primarily because of the relatively slow microprocessor used. Not so with the 2068! I have found it very difficult to outdo the speed of this machine and I have a relatively decent touch typing speed. All in all TYPE is an excellent program for which we all should thank Mr. Lees. This modified version should prove to be even more enjoyable to use than the original by combining the keyboard, expanded character set, and speed of the TS 2068. This article was completely prepared using TYPE 2068, a TS 2068, and a TS 2040 printer!

Listing for TYPE 2068

```
  1 REM This program was ori-
ginally written by R. J. Lees-
W3ZQN for the Timex/Sinclair
1000 computers and published in
the May 1983 issue of QZX.  This
modification was written for the
Timex/Sinclair 2068 computer by
Kraig D. Pritts-KA2LHO and makes
use of some of the expanded cap-
abilities of this machine.
  2 BORDER 5
  3 CLS
  5 LET l=0
 10 LET n=0
 20 LET c=0
 30 PRINT AT n,c;"■"
 50 IF INKEY$<>"" THEN GO TO 50
 60 IF INKEY$="" THEN GO TO 60
 80 PRINT AT n,c;INKEY$
 90 IF INKEY$=CHR$ 13 THEN GO T
O 300
100 IF INKEY$=CHR$ 8 THEN GO TO
400
102 IF INKEY$=CHR$ 10 THEN GO T
O 450
104 IF INKEY$=CHR$ 11 THEN GO T
O 475
110 IF INKEY$=CHR$ 12 THEN GO T
O 500
120 IF INKEY$=CHR$ 7 AND c=0 TH
EN GO TO 600
130 LET c=c+1
140 IF c=32 THEN GO TO 410
150 IF c<27 THEN PRINT AT n,c;"
■"
160 IF c=27 THEN PRINT AT n,c;"
■"
170 IF c=28 THEN PRINT AT n,c;"
■"
180 IF c=29 THEN PRINT AT n,c;"
■"
190 IF c=30 THEN PRINT AT n,c;"
■"
200 IF c=31 THEN PRINT AT n,c;"
■"
210 GO TO 40
300 PRINT AT n,c;" "
320 GO TO 130
400 PRINT AT n,c;" "
410 LET l=l+1
420 IF l=22 THEN GO TO 700
430 LET n=n+1: GO TO 20
450 PRINT AT n,c;" "
455 LET l=l+1
460 IF l=22 THEN GO TO 700
465 LET n=n+1: GO TO 30
475 PRINT AT n,c;" "
480 LET l=l-1
485 LET n=n-1: GO TO 30
500 PRINT AT n,c;" "
510 IF c=0 THEN GO TO 530
520 LET c=c-1
530 GO TO 30
```

REVIEW AND COMPARISON OF Q-SAVE AND Z-XLR8 FAST LOAD PACKAGES

Kraig D. Pritts-KA2LHO

Because of the slow data transfer speed of the TS 1000 (ZX 81) and the high cost of disk-drives and related interfaces, many of us have searched for a less expensive alternative to speed up the load/save times on our machines. As a result we have seen a number of fast load programs that can, for as little as $9.95, load a program in a fraction of the time normally required. This article will look at and compare two very popular routines, both of which I own and have used for several months. The packages are the Q-Save package available from Intercomputer, Inc., 358 Chestnut Hill Ave., Boston, MA 02146 and also the Z-XLR8 package from G. Russell Electronics, RD 1, Box 539, Centre Hall, PA 16828. The chart which follows this article is a summary of the comparisons and I will make some general comments in reference to this chart.

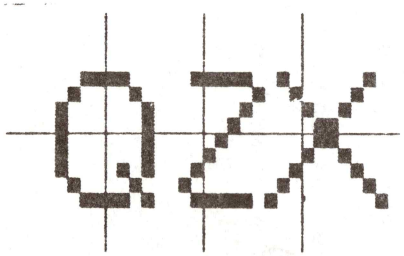
The Q-Save package has two very distinct advantages. First of all it is about twice as fast (on my equipment) by loading a 16K program in just under 30 seconds. Secondly, it can be incorporated into the program as an auto-start routine to eliminate the possibility of using RUN on a database and then "goodbye data". On the other hand the Z-XLR8 package is much less expensive and does not require any additional hardware. It has many features in addition to load and save which include data load/save, binary load/save, graphics load/save, high resolution graphics load/save (designed to be used with the Advanced Interface Design high res graphics board), and index load. Z-XLR8 is also easily relocatable by simply responding to the starting location user prompt. To do this same relocation with Q-Save requires listing the BASIC portion of the program, making some calculations, and rewriting one line of BASIC within the program.

Both packages can be used with a Hunter Board (which makes them both very convenient to access) and each takes up only a small amount of memory. This latter fact is a concern if you are using only a 16K memory. Each comes on a cassette tape and all materials needed to put the program to work fairly in a short amount of time. The Q-Save, as I mentioned previously, includes a filter/amplifier which cleans up the signal and improves all load/save whether at fast or regular speed. Z-XLR8 on the other hand includes a calibration program which allows you to set the program for optimum compatibility with your equipment and allowing for load/save speed adjustment to reduce data read errors. On both systems you need to have a concern for correct tape head alignment to prevent errors.

These are by no means the only two packages available for the Sinclair user but they are two of the very popular ones. Besides that they are the only two that I own!!! The choice is yours---Q-Save has the speed but is expensive while Z-XLR8 is cost effective and packed with features. If you have never used a fast load routine then you are wasting a lot of time waiting for the Sinclair data transfer speeds. I think you will be pleased with whatever system you decide upon.

COMPARISON CHART OF Q-SAVE AND Z-XLR8 FAST LOAD PACKAGES

FEATURE	Z-XLR8	Q-SAVE
LOAD/SAVE SPEED (16K)	45-60 seconds depending upon quality of tape equipment	29 seconds
RELOCATABLE	Yes, via user prompts	Yes, within BASIC program (see text)
EXTRA FEATURES	Data load/save, graphics load/save, index load, binary load/save, calibration, hi res gr load/save	Verify
AUTO-START	No	Yes
MEMORY USED	2 K	½ K
TAPE LOAD TIME (Fast load/save tape)	1 minute, 35 seconds	38 seconds
EXTRA HARDWARE	None required	Filter/Amp included
DOCUMENTATION	Excellent 22 page booklet	Poor 4 page leaflet
OTHER MISC.	Available on EPROM	Available on cartridge
PRICE	$9.95	$37.95



User graphics QZX = ACEG BDFH

Change pattern? Press C.
List codes?-L. Run again?-R

```
A:0     C:0     E:0     G:0
  0       0       0       0
  0       0       0       0
  0       0       0       0
  3     193     242       4
  4      32       9       8
  8      16      16     144
  8      16      32      96
B:8     D:16    F:64    H:96
  8      16     128     144
  8      81       1       8
  4      34       2       4
  3     209     244       2
  0       0       0       0
  0       0       0       0
  0       0       0       0
```

User graphics QZX = ACEG BDFH

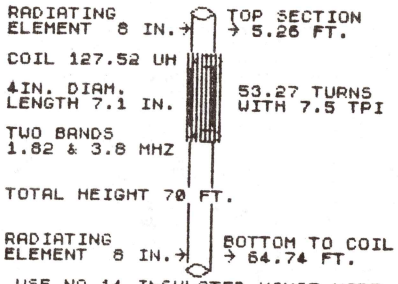

```
  10 REM USER DEFINED GRAPHIC PL
OTTER
  20 REM BY DAVID ELPHICK
  25 PAPER 1: BORDER 1: INK 7: C
LS
  30 DIM a(16,32): DIM b(64)
  50 LET x=0: LET y=0: PRINT AT
2,0;"A MEANS OF MAKING USER DEFI
NED"'"GRAPHICS. DRAW WITH ■ CURS
OR"'"IN ONE OR MORE OF 8 SQUARES
"'"WHICH WILL BE LETTERS A TO G"

 51 PRINT AT 17,0;"USE CURSOR A
RROWS TO MOVE"'"HOLDING CAPS SHI
FT LEAVES MARKER"'"MOVING ""*""E
RASES TOO (wait if G)": PAUSE 10
00: CLS
  60 PRINT AT 20,0;"
                    For normal s
ize graphic, press G"
  80 PRINT AT y,x;"*": PLOT 0,11
1: DRAW 255,0: PLOT 64,175: DRAW
0,-126: PLOT 128,175: DRAW 0,-1
26: PLOT 192,175: DRAW 0,-126: P
RINT AT y,x;" "
 100 LET k=CODE INKEY$
 110 IF k=0 THEN GO TO 80
 120 IF k>7 AND k<12 THEN PRINT
AT y,x;"■": LET a(y+1,x+1)=1
 130 IF INKEY$="g" THEN GO TO 20
0
 135 LET x=x+(k=9)-(k=8)
 140 LET y=y+(k=10)-(k=11)
 145 LET x=x+(k=56)-(k=53)
 150 LET y=y+(k=54)-(k=55)
 160 IF x=-1 THEN LET x=0
 161 IF x=32 THEN LET x=31
 162 IF y=-1 THEN LET y=0
 163 IF y=16 THEN LET y=15
 170 LET a(y+1,x+1)=0
 180 GO TO 80
 200 FOR m=0 TO 3
 210 FOR n=1 TO 16
 220 LET c=16*m+n
 240 LET d=8*m
 250 LET b(c)=a(n,1+d)*128+a(n,2
+d)*64+a(n,3+d)*32+a(n,4+d)*16+a
(n,5+d)*8+a(n,6+d)*4+a(n,7+d)*2+
a(n,8+d)
 260 POKE USR "c"+c-1,b(c)
 280 NEXT n
 290 NEXT m
 300 GO SUB 500
 310 PRINT AT 20,0;"Change patte
rn? Press C.          List codes?-
L.  Run again?-R
                    "
 320 IF INKEY$="c" THEN GO TO 51
 325 IF INKEY$="l" THEN GO TO 35
0
 330 IF INKEY$="r" THEN RUN
 340 GO TO 320
 350 CLS
 360 PRINT AT 0,0;"A: ";AT 8,0;"B
: ";AT 0,8;"C:  ";AT 8,8;"D: ";AT
0,16;"E:  ";AT 8,16;"F:  ";AT 0,24
;"G:  ";AT 8,24;"H: "
 370 FOR m=0 TO 3
 375 FOR n=1 TO 16
 380 PRINT AT n-1,2+8*m;a(n+16*m
)
 385 NEXT n
 390 NEXT m
 400 GO SUB 500
 402 PAUSE 4e4
 403 CLS
 405 GO SUB 700
 410 PRINT AT 21,0;"To re-run, P
ress R"
 420 IF INKEY$="r" THEN RUN
 430 GO TO 420
 500 PRINT AT 17,0;"User graphic
s QZX = ACEG";AT 18,14;"QZX
BDFH": REM ■ etc= User graphics
 510 RETURN
 600 SAVE "DRAW GRAF4" LINE 10
 610 STOP
 700 PRINT "to use make letters
A-G DATA""XXXX FOR A=USR "A"
" TO USR ""G""+7""XXXX READ USE
R:POKE A,USER""XXXX NEXT A:RETU
RN""(Next 8 lines DATA : press
L )"
 710 RETURN
```

(from ZX computing - WA6DLI)

```
   1 REM morse trainer
   2 REM XNSLATED TO 2068 BY
WA6DLI FROM SPECTRUM PROGRAM
RJ GILBERT IN AUG/SEPT'83 ZX
COMPUTING
   5 POKE 23609,20
  10 DIM m$(7)
  15 DIM i$(250)
  18 PRINT "TRY 9 & 20 FOR PITCH
&SPEED"
  20 INPUT "PITCH";P
  25 INPUT "SPEED";S
  35 LET H=S/100: LET T=S/300
  40 POKE 23658,8
  45 INPUT "X=alter speed/Pitch
(e.g. 9&20)" ''"T=TEST""N=New Ph
rase"''    ENTER=repeat"; LINE A$
  50 IF A$="" THEN GO TO 70
  55 IF A$="X" THEN GO TO 20
  60 IF A$="T" THEN GO TO 300
  65 INPUT "ENTER Letter or Word
", LINE i$
  70 POKE 23692,2
  75 PRINT AT 21,0;"
                    "
  80 FOR b=1 TO LEN i$
  85 IF i$(b)="0" THEN LET m$="
-----"
  90 IF i$(b)=" " THEN GO TO 40
  95 FOR r=1 TO (CODE i$(b)-64)
 100 READ m$: NEXT r
 105 RESTORE
 110 PRINT m$( TO )
 115 POKE 23692,2
 120 GO SUB 200
 125 NEXT b
 130 GO TO 40
 150 DATA ".-","-...","-.-.","-
..","."
,"..-.","--.","....","..",".---","
-.-","
.-..","--","-.","---",".--.","--.-
",".-.","...","-","..-","...-",".--
.","-..-
","-.--","--..","X-.-","Y-.--","Z--
.."
 200 FOR N=2 TO 6
 210 IF m$(n)="-" THEN BEEP H,P
 220 IF m$(n)="." THEN BEEP T,P
 230 NEXT N
 240 RETURN
 300 CLS : PRINT "I WILL GIVE YO
U A MORSE LETTER AND I WANT YOU
TO TELL ME WHAT    IT IS IN 3 ATT
EMPTS                PRESS ENTER t
o escape" : PAUSE 100
 305 LET c=0
 310 FOR r=1 TO (RND*26)+1
 315 READ m$
 320 NEXT r
 325 RESTORE
 330 GO SUB 200
 335 INPUT "WHAT WAS IT? "; LINE
n$
 340 IF n$="" THEN CLS : GO TO 4
0
 345 IF CODE n$>90 OR CODE n$<65
THEN GO TO 335
 350 IF n$=m$(1) THEN PRINT ; PR
INT "Correct it was ";m$
 355 IF n$=m$(1) THEN PAUSE 50
GO SUB 200: PAUSE 200: GO TO 300
 360 PRINT : PRINT : PRINT "WRON
G! it was not ";n$: PAUSE 75
 365 LET c=c+1
 370 IF c=3 THEN PRINT " It was"
;m$: PAUSE 50: GO SUB 200: PAUSE
 120: GO TO 300
 375 PRINT " TRY AGAIN": PAUSE 5
0
 380 GO TO 330
 400 SAVE "MORSE" LINE 1
```

```
  5 PAPER 1: BORDER 1: INK 7
 10 CLS
 20 PRINT " A DESIGN PROGRAM FO
R DESIGNING"
 25 GO SUB 4000
 30 PRINT "A 2-BAND SHORTENED A
ND LOADED"
 40 PRINT "VERTICAL ANTENNA.";
 50 PRINT "     BY PHIL RAND-W1DB
M  JULY 15, 1983"'''
 55 PRINT INVERSE 1; INK 2;", T
IMEX 2068 VERSION BY WA6DLI  ";
INVERSE 0
 60 PRINT
 61 LET J=0
 62 LET D=0
 65 LET B=0
 66 LET F=0
 67 LET F2=0
 68 LET H=0
 69 LET K1=0
 70 INPUT "ENTER FREQ. IN LOWER
 BAND ";F
 75 PRINT F
 80 INPUT "ENTER A FREQ. IN HIG
HER BAND ";F2: PRINT F2
 85 PRINT
 90 INPUT "ENTRIES ALL OK? Y/N?
";Y$
 95 IF Y$<>"Y" THEN GO TO 70
100 PRINT
110 INPUT "ENTER OVERALL VERT,
ANT. HEIGHT ";H
115 PRINT H
130 LET A=2*H
140 PRINT "IS RADIATING ELEMENT
 WIRE? Y/N?";
145 INPUT Y$: PRINT Y$
160 IF Y$="Y" THEN GO TO 1090
170 IF Y$="N" THEN GO TO 1240
180 IF Y$<>"Y" THEN GO TO 145
190 IF Y$<>"N" THEN GO TO 145
200 GO SUB 1280
210 LET B=246*K1/F2
220 LET SL=B
240 LET AA=10↑6/(68*PI↑2*F↑2)
250 LET DD=(234/F)-B
260 LET GG=(A/2)-B
270 LET BB=LN (24*DD/D)-1
280 LET CC=(1-F*B/234)↑2-1
290 LET EE=LN (24*GG/D)-1
300 LET FF=(F*GG/234)↑2-1
310 LET E0=AA*((BB*CC/DD)-(EE*F
F/GG))
320 LET E0=INT (E0*100+.5)/100
330 PRINT
340 CLS
350 PRINT """L""OF LOADING COIL
IS ";E0;"/""U";"H"
360 PRINT INVERSE 1;"**CALCULAT
ING SIZE OF COIL**"; INVERSE 0
370 INPUT "DIAMETER OF LOADING
COIL";DL
375 PRINT DL
390 LET A=DL/2
400 LET B=5
410 CLS
420 PRINT "ENTER COIL WIRE-GAGE
, 12 TO 16 ";
430 PRINT
440 PRINT "          - OR -"
445 PRINT
450 PRINT "ENTER ""1"" FOR B&W
10 TURNS/INCH COILSTOCK"
460 PRINT "ENTER ""2"" FOR #12
GAGE INSULATED HOUSE WIRE"
470 PRINT "ENTER ""4"" FOR #14
GAGE INSULATED HOUSE WIRE"
480 PRINT "ENTER ""6"" FOR #20
INSULATED HOOK-UP WIRE"
490 INPUT W: PRINT W
500 IF W=1 THEN LET WW=10
510 IF W=2 THEN LET WW=6.5
520 IF W=4 THEN LET WW=7.5
530 IF W=6 THEN LET WW=14
540 IF W=12 THEN LET WW=12
550 IF W=13 THEN LET WW=13.5
560 IF W=14 THEN LET WW=15
570 IF W=15 THEN LET WW=16.8
580 IF W=16 THEN LET WW=18.9
590 CLS
600 PRINT TAB 5; INVERSE 1;"**I
TERATING FORMULA**"; INVERSE 0
610 PRINT TAB 7;"TURNS";TAB 15;
"LENGTH"
620 LET X=1
630 FOR I=1 TO 12
640 LET N=SQR (E0*(9*A+10*B))/A
650 LET N=INT (N*100+.5)/100
660 LET B=INT (B*100+.5)/100
670 PRINT "NO. ";X;TAB 8;N;TAB
15;B
680 LET B=N/WW
690 LET B=INT (B*100+.5)/100
700 LET X=X+1
710 NEXT I
720 PRINT " PRESS ANY KEY TO CO
NTINUE "
730 PAUSE 4E4
740 CLS
750 PRINT INVERSE 1;"***ANTENNA
 AND COIL DATA***"; INVERSE 0
752 PRINT
758 PRINT " FREQ.S ARE ";F;" AN
D ";F2;" MHZ."
759 PRINT
760 PRINT " DIAM. ANT.ELEMENT I
S ";D;" IN."
775 PRINT
780 PRINT " HT. OF VERT. ANT. I
S ";H;" FEET."
790 LET SL=INT (SL*100+.5)/100
795 PRINT
800 PRINT " LENGTH FROM BOTTOM
OF ANT."
810 PRINT " TO COIL IS ";SL;" F
EET."
820 LET TL=H-SL
825 PRINT
830 PRINT " LENGTH OF TOP SECTI
ON: ";TL;" FT."
835 PRINT
840 PRINT " COIL INDUCTANCE IS
";E0;"/UH."
845 PRINT
850 PRINT " DIAM. OF COIL IS ";
DL;" INCHES."
860 PRINT " LENGTH OF COIL IS "
;B;" INCHES."
870 PRINT " TURNS PER INCH IS "
;WW
880 PRINT " TOTAL NO. OF TURNS
IS ";N
882 LET Q=N
883 LET Z=B
885 PRINT
890 IF W=1 THEN GO TO 960
900 IF W=2 THEN GO TO 990
910 IF W=4 THEN GO TO 1020
920 IF W=6 THEN GO TO 1050
930 PRINT "USE ";W;" GAGE ENAME
LED MAGNET WIRE"'" FOR WINDING C
OIL"
945 PAUSE 4E4
947 LET J=J+1
948 IF J>=2 THEN STOP
950 GO TO 1075
960 PRINT " USE B&W 10 TURNS/IN
CH COIL"'"STOCK FOR THE COIL."
980 GO TO 1075
990 PRINT " USE NO.12 INSULATED
 HOUSE WIRE"'"FOR THE COIL."
1010 GO TO 1075
1020 PRINT " USE NO.14 INSULATED
 HOUSE WIRE"'"FOR THE COIL."
1040 GO TO 1075
1050 PRINT " USE NO. 20 INSULATE
D"'"HOOK-UP WIRE FOR THE COIL."
1060 PAUSE 4E4
1070 GO TO 1075
1075 PAUSE 4E4
1076 GO TO 2000
1080 STOP
1085 SAVE "VERT ANT4" LINE 0
1087 STOP
1090 INPUT "ENTER WIRE-GAGE, 10
TO 16(ONLY EVEN #)";GA
1100 PRINT GA
1120 IF GA=10 THEN LET D=.1019
1130 IF GA<>10 THEN GO TO 1150
1140 IF D=.1019 THEN GO TO 200
1150 IF GA=12 THEN LET D=.0808
1160 IF GA<>12 THEN GO TO 1180
1170 IF D=.0808 THEN GO TO 200
1180 IF GA=14 THEN LET D=.064
1190 IF GA<>14 THEN GO TO 1210
1200 IF D=.064 THEN GO TO 200
1210 IF GA=16 THEN LET D=.0508
1220 IF GA<>16 THEN GO TO 1240
1230 IF D=.0508 THEN GO TO 200
1240 INPUT "ENTER ANT.ELEMENT DI
AM.IN INCHES";D
1245 PRINT D
1260 GO TO 200
1270 REM L=ANT LENGTH IN FT.
1280 LET L=A
1290 LET DF=D/12
1300 LET R=L/DF
1305 LET K=0
1310 IF R<5.0 THEN LET K=.90
1320 IF K=.90 THEN GO TO 1480
1330 IF R<8 THEN LET K=.91
1340 IF K=.91 THEN GO TO 1480
1350 IF R<13 THEN LET K=.92
1360 IF K=.92 THEN GO TO 1480
1370 IF R<17 THEN LET K=.93
1380 IF K=.93 THEN GO TO 1480
1390 IF R<25 THEN LET K=.94
1400 IF K=.94 THEN GO TO 1480
1410 IF R<50 THEN LET K=.95
1420 IF K=.95 THEN GO TO 1480
1430 IF R<250 THEN LET K=.96
1440 IF K=.96 THEN GO TO 1480
1450 IF R<5000 THEN LET K=.97
1460 IF K=.97 THEN GO TO 1480
1470 IF R>=5000 THEN LET K=.98
1480 LET K1=K+.04
1485 IF Y$="N" THEN GO TO 210
1490 RETURN : REM ( TO 390)
2000 REM DRAW FIGURE
2010 CLS
2015 PRINT AT 2,15;"◇": REM AC
IN UDG
2025 PLOT 136,20
2030 FOR Y=20 TO 155
2035 PLOT 136,Y
2040 NEXT Y
2045 PLOT 121,20
2050 FOR Y=20 TO 155
2055 PLOT 121,Y
2060 NEXT Y
2070 PRINT AT 5,15;"□": REM RT
 SHIFT & D IN UDG
2075 PRINT AT 10,15;"□": REM S
EE ABOVE
2078 FOR V=119 TO 142 STEP 3
2079 FOR Y=88 TO 135
2080 PLOT 120,90
2082 PLOT V,Y
2085 NEXT Y
2090 NEXT V
3000 PRINT AT 2,0;"RADIATING"'"E
LEMENT  ";D;" IN.→": REM ARROW E
 IN UDG
3005 PRINT AT 5,0;"COIL ";E0;" U
H"''DL;"IN. DIAM."'"LENGTH ";Z;"
 IN."
3010 PRINT AT 10,0;"TWO BANDS"'F
;" & ";F2;" MHZ"
3020 PRINT AT 14,0;"TOTAL HEIGHT
 ";H;" FT."
3025 PRINT AT 17,0;"RADIATING"'"
ELEMENT  ";D;" IN.→"
3030 PRINT AT 2,18;"TOP SECTION"
;AT 3,18;"→ ";TL;" FT."
3035 PRINT AT 17,18;"BOTTOM TO C
OIL";AT 18,18;"→ ";SL;" FT."
3040 PRINT AT 7,19;Q;" TURNS";AT
 8,19;"WITH ";WW;" TPI"
3050 PRINT AT 19,15;"◇"
3055 GO TO 890
3999 STOP
4000 FOR A=USR "A" TO USR "F"+7
4010 READ USER: POKE A,USER
4020 NEXT A: RETURN
4030 DATA 7,24,96,128,96,24,7,0
4040 DATA 0,7,8,16,32,16,8,7
4050 DATA 224,24,6,1,6,24,224,0
4060 DATA 0,255,0,0,0,0,0,255
4070 DATA 3,4,2,127,2,4,8,0
4080 DATA 0,224,16,8,4,8,16,224
```


RADIATING ELEMENT 8 IN.→
TOP SECTION → 5.26 FT.
COIL 127.52 UH
4IN. DIAM. LENGTH 7.1 IN.
53.27 TURNS WITH 7.5 TPI
TWO BANDS 1.82 & 3.8 MHZ
TOTAL HEIGHT 70 FT.
RADIATING ELEMENT 8 IN.→
BOTTOM TO COIL → 64.74 FT.

USE NO.14 INSULATED HOUSE WIRE FOR THE COIL.

```
---ANTENNA AND COIL DATA---

FREQ.S ARE 1.82 AND 3.8 MHZ.

DIAM. ANT.ELEMENT IS 8 IN.

HT. OF VERT. ANT. IS 70 FEET.

LENGTH FROM BOTTOM OF ANT.
TO COIL IS 64.74 FEET.

LENGTH OF TOP SECTION: 5.26 FT.

COIL INDUCTANCE IS 127.52/UH.

DIAM. OF COIL IS 4 INCHES.
LENGTH OF COIL IS 7.1 INCHES.
TURNS PER INCH IS 7.5
TOTAL NO. OF TURNS IS 53.27
```

USE NO.14 INSULATED HOUSE WIRE FOR THE COIL.

```
 A DESIGN PROGRAM FOR DESIGNING
A 2-BAND SHORTENED AND LOADED
VERTICAL ANTENNA.   BY PHIL RAND
-W1DBM  JULY 15, 1983

TIMEX 2068 VERSION BY WA6DLI
```

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: ZX81/TS1000 edgeboard wire wrap connectors; keyed; bifurcated contacts; manufactured by TI; $5.00 each. Pc piggy-back extender boards; $1.50 each. Economical experimenting with Radio-Shack's 276-158 and 161 project boards and these connectors. Add $0.75 shipping per order. Paul Hunter, 1630 Forest Hills Drive, Okemos, MI 48864.

FOR SALE: IMPROVED Chebyshev/Butterworth filter design program. Listing $1, cassette $5. C. Milazzo, USNS Box 3007, FPO Miami FL 34051.

FOR SALE: CWSS users: MLI speeds up your program and gives you a delete function. Don't XMIT your mistakes, DELETE them! MLI cassette and simple instructions- $7.50 ppd. John McGinley / 203 Milwaukee St / Mauston, WI 53948.

FOR SALE: MORSE CODE TEACHER II. New improved. Sophisticated code teacher sends perfect code thru TV, amp, or recorder at 1-20 WPM. Chose ANY portion of alphabet, numbers, or punctuation. Sends single random characters, tutoring you until you get it right. Gives score at end. Also sends multiple characters in any combination you select. You say how many to send up to 3000. Gives screen and printer compare copy. Store your own text and play over & over. Realistic length code even at 1 WPM. GREAT FOR CODE CLASSES. Learn code without a teacher! For 16K ZX/TS-1000. Money-back guarantee! Send $8.95 for tape, listing, & doc. to CLEM WEHNER, K5KGM, 2135A, Willowwood Lane, Scott, IL 62225.

FOR SALE: TS1500 + 16 K Ram + TS2040 3 mos old. All or seperately $60, $15, $60 or $125.00. Ron Forbis NW4M, 2418 Carmel Rd., Birmingham, AL 35235.

FOR SALE: Buffered Buss Expansion Board - $40 and I/O board -$10. Both for ZX81, TS1000, TS1500, and I/O for TS2068 too. Bare boards ppd with documentation. Budget Robotics & Computing, Box 18616, Tucson, AZ, 85731.

BITS AND BYTES

47. A hint from a British publication supplied by WA6DLI warns "never use butter as a lubricant on your Sinclair printer." (Wonder why? Hungry cat killed by printer carriage?..Ed..)

48. Some people have had trouble loading the tape which comes with the T/S Modem. The difficulty with this (and other tapes) is sometimes cured by plugging the tape recorder into a different socket than that into which the computer is plugged. (Hum is thereby reduced.)

49. The Timex maintenance point has advised that they will honor the 90 day warranty from the date of sale. After that they will repair any T/S 2068 for no more than $30 and repair a T/S Printer for no more than $25. The cost for a T/S 1500 is no more than $25 and the TS 1000 will cost up to $15.

QZX FRIENDS

NW4M -- Ron wrote "I wanted to tell you that last week I received an 'A&J' MicroDrive. And it is super. It works really well and appears to be well constructed. Since I use NU4V's CWSS and NRAP quite a bit I really appreciate the speed which I can now change from CWSS to NRAP or vice versa. I got out the old stopwatch and did these timings. From installing the 20' tape it takes 41 seconds to load CWSS (after typing in Print USR 12345 then selecting #2 from menu then typing in CWSS when asked what program) it took 29 more seconds to change to NRAP."

WA6LDI writes that the production of the 2050 modem for the T/S 1500 and T/S 2068, which was produced by Westridge, had been taken over by Anchor Automation, Van Nuys, CA [(818)-997-7758] because the founder of Westridge died unexpectedly in the midst of making the original Timex modem available.

W5GAA -- Frank presently has two 2068's, two 1500's, one 1000 and one ZX-81. He is using one T/S 2068 with TASWORD II word processing, TASMAN Centronics parallel interface and an OLIVETTI PR-2300 ink jet printer. His primary activity is working OSCAR-10, mode B, using a T/S 2068 acquision and tracking program which he recently prepared for AMSAT. He also uses a Westridge 2050 modem with MTERM SMART-II software for his other T/S 2068, with which he is well pleased.

WA2RUW -- J C says the he is still using his ZX81, T/S 1500, and printer. He also says that many of his friends are getting T/S 1000's.